Claims

1. A copolymer containing at least two or more polymer segments, where at least one polymer segment contains a phosphoryl derivative represented by the following general formula (1) and at least one polymer segment never contains a phosphoryl derivative represented by the following general formula (1):

(1)

where R independently represents hydrocarbon, an aromatic ring, hydrogen, a metal ion or onium ion.

2. A copolymer according to claim 1, where the polymer segment containing the phosphoryl derivative contains at least one or more polymerization units selected from the general formulas (2) and (3):

where R independently represents hydrocarbon, an aromatic ring, hydrogen, a metal ion or onium ion.

3. A copolymer according to claim 1 or 2, the copolymer being a block copolymer.

- 4. A copolymer according to claim 3, where at least one polymer segment never containing the phosphoryl derivative is a polystyrene derivative.
- 5. A copolymer according to claim 1 or 2, the copolymer being a graft copolymer.
- 6. A copolymer according to any of claims 1 through 5, where the phosphoryl derivative is phosphonic acid or a salt thereof.
- 7. A copolymer according to any of claims 1 through 6, the copolymer being synthetically prepared by radical polymerization.
- 8. A composition containing a copolymer according to any of claims 1 through 7.
 - 9. An ion exchanger comprising a copolymer according to any of claims 1 through 7 or a composition according to claim
 8.
 - 10. An ion adsorbent comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.
 - 11. A polymeric electrolyte comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.
 - 12. An ion conductor comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.

- 13. A proton conductor comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.
- 14. An ion exchange membrane for fuel cell, the ion exchange membrane comprising a copolymer according to any of claims 1 through 7 or a composition according to claim 8.
- 15. A fuel cell using a copolymer according to any of claims 1 through 7, a composition according to claim 8 or an ion exchange membrane according to claim 14.
- 16. An electrochemical device using a copolymer according to any of claims 1 through 7, a composition according to claim 8 or an ion exchange membrane according to claim 14.
- 17. A molded article prepared by molding and processing a copolymer according to any of claims 1 through 7 or a composition according to claim 8.
- 18. A molded article according to claim 17, where the individual polymer segments in the copolymer are capable to micro-phase separation.
- 19. A molded article according to claim 17 or 18, the molded article being an ion exchanger, an ion adsorbent, a polymeric electrolyte, an ion conductor and a proton conductor.